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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Chiaki Aoyama

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CARRIER BLACKMAN AND ASSOCIATES

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SUITE 100

NOVI, MI 48375

EXAMINER

RASHID, DAVID

ART UNIT

PAPER NUMBER

2624

NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/806,547	Applicant(s) AOYAMA, CHIAKI	
	Examiner DAVID P. RASHID	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7 and 10-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,10,11,15 and 16 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

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Amendments & Claim Status

[1] This office action is responsive to Amendment-F received on Jan. 27, 2009. Claims 1-5, 7, and 10-16 remain pending; claims 15-16 new.

Claim Rejections - 35 U.S.C. § 112

[2] In response to Amendments to the Claims received on Jan. 27, 2009, the previous § 112 rejections are withdrawn.

Claim Rejections - 35 U.S.C. § 101

[3] In response to Amendments to the Claims received on Jan. 27, 2009, the previous § 101 rejections are withdrawn.

Response to Arguments

Remarks Unpersuasive regarding Rejections Under 35 U.S.C. § 102

Initially, applicant respectfully submits that the applied references fail to make obvious the claimed invention because the apparatus disclosed by each of Genco and Spence has nothing to do with providing fundamental compensation for the distortion of *an image captured by a camera unit including a lens /lens system* so that the position of an object within the image may be accurately determined, or with determining a discrepancy of light (a light beam) penetrating the lens system relative to an optical center of the lens system.

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...

Applicant also respectfully submits that both of the applied references are non-analogous art to the claimed invention, such that persons of ordinary skill in the art would not have looked to either of these references even if such persons were considering hypothetical modifications to a camera unit containing a lens / lens system which captures images having objects therein. Clearly, neither reference discloses or pertains to a camera unit and hence are not in the same field of endeavor as the claimed invention.

...

Applicant's Remarks at 16-18.

Remarks filed Jan. 27, 2009 with respect to claims 1-3, 7, 7, 10, and 12-14 have been considered but are moot in view of the new ground(s) of rejection.

Upon careful consideration and in light of the above amendments, applicant respectfully submits that the rejection is overcome and that present claim 4 is patentably distinct over the applied references because Day fails to overcome the basic deficiencies of Genco and Spence as discussed above

...

Additionally, persons of ordinary skill in the art would not consider the Examiner's proposed further modification to the hypothetical combination of Genco's and Spence's relative to select features of Day pertaining to use of multiple cameras and a storage means to be obvious because the references do not provide any motivation for the proposed modification, and the Examiner has not identified any other appropriate motivation for the proposed modification under 35 USC 103.

Applicant's Remarks at 19-20.

Remarks filed Jan. 27, 2009 with respect to claim 4 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 U.S.C. § 103

[4] The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Genco et al. in view of Beuker et al.

[5] **Claims 1-3, 5, 7, 10, 12-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between U.S. Reg. No. H000315 (published Aug. 4, 1987, hereinafter

“Genco et al.”) in view of U.S. Pub. No. 2002/0018589 (published Feb. 14, 2002, hereinafter “Beuker et al.”).

Regarding **claim 1**, while *Genco et al.* discloses a method for measuring a position (the positions in grid pattern item 32 at fig. 2) of an object (fig. 2, item 12; fig. 2, item 36) according to an image (fig. 2, item 34) of the object captured by a camera unit (fig. 2, items 10, 18) wherein the object (fig. 2, item 12; fig. 2, item 36) is contained within the image (fig. 2, item 34) captured by the camera unit (fig. 2, items 10, 18), the method comprising the steps of:

capturing an image (fig. 2, item 34) containing an object (fig. 2, item 12; fig. 2, item 36) using a camera unit (fig. 2, item 18) with a lens system (fig. 2, items T, 16);

calculating a discrepancy (the discrepancy between item 30 and 36 in fig. 2; “distance ‘S’ from the optical center of the grid pattern 32 which was the location of the first image 30” at 3:58-61) of an incident beam of light (“point source of light” item 12 at fig. 2) penetrating the lens system (fig. 2, items T, 16) of the camera unit (fig. 2, items 10, 18) relative to an optical center (“the optical center of the grid pattern 32 which was the location of the first image 30” at 3:51-62; fig. 2, item 30 obtained from fig. 1) of the lens system; and

wherein a distance between the object and the camera unit is not known prior to measuring the position of the object (*Genco et al.* does not disclose that said distance is known, thus it need not be known and thus not known);

wherein the incident beam of light (“point source of light” item 12 at fig. 2) is directly projected from the object (fig. 2, item 12) to the lens system (“point light source 12 may be noncoherent light emitted by a small size ordinary penlight bulb” at 2:62-64); and

wherein said discrepancy (the discrepancy between items 30 and 36 in fig. 2) is a minimum distance (the discrepancy distance between item 30 and 36 in fig. 2 is minimal on the grid as it is a direct 2D line, as there is no other way of calculating a closer distance on the grid) between the optical center (fig. 2, item 30) and said incident beam of light (“point source of light” item 12 at fig. 2),

Genco et al. does not disclose compensating a position of the object contained in the captured image according to the calculated discrepancy (i.e., moving item 36 to overlap item 30).

Beuker et al. teaches compensating a position of an object (e.g., fig. 4, item 16) contained in a captured image (leg item 16 in captured image item 41_{n-1} is aligned with captured image

item 41_n at fig. 4) according to a calculated discrepancy (the discrepancy calculated from e.g., item 43' and item 43'' at fig. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the position of the object contained in the captured image according to the calculated discrepancy of *Genco et al.* to be compensated by overlapping as taught by *Beuker et al.* "to provide apparatus and methods which simply and stably determine accurate projective transformation relating two images from pairs of corresponding points identified in each image of the pair." *Beuker et al.* at para.0009.

Regarding **claim 2**, while *Genco et al.* discloses a method for measuring a position (the positions in grid pattern item 32 at fig. 2) of an object (fig. 2, item 12) with a combination of an image (fig. 2, item 34) of the object captured by a camera unit (fig. 2, item 18) and calibration information (fig. 1 is calibration to obtain item 30 of fig. 2) for the camera unit (fig. 2, item 18), the calibration information being prepared in advance in such a manner that a position of a measurement pixel of the image is correlated with a direction (the direction of light directed from item 12 at fig. 2) of an incident beam of light ("point source of light" item 12 at fig. 2) and a displacement (the distance between items 30 and 36 in fig. 2) from a reference point (fig. 2, item 30) to the incident beam (fig. 10, item d), the method comprising the steps of:

(a) capturing an image (fig. 2, item 34 is incorporated) containing an object (fig. 2, item 12; fig. 2, item 36) using a camera unit (fig. 2, item 18) with a lens, the object (fig. 2, item 36) being contained within the image (fig. 2, item 34) captured by the camera unit;

(b) detecting a position (where item 36 is on grid pattern item 32) of a pixel (fig. 2, item 36) representative of the object (fig. 2, item 12) in the image (fig. 2, item 34) captured at step (a); and

(c) calculating the position (where item 36 is on grid pattern item 32) of the object (fig. 2, item 36) contained in the captured image (fig. 2, item 34) according to the direction and the displacement of the incident beam (the grid pattern item 32 calculates the position of item 36, its displacement and direction with respect to the calibration information item 30), which are obtained from the calibration information (fig. 1 is calibration to obtain item 30 of fig. 2) with reference to the position (where item 36 is on grid pattern item 32) of the pixel (fig. 2, item 36) detected at step (b);

wherein the displacement of the incident beam of light relative to the reference point is a discrepancy of the incident beam of light relative to an optical center (“the optical center of the grid pattern 32 which was the location of the first image 30” at 3:51-62; fig. 2, item 30) of a lens of the camera unit;

wherein said discrepancy is a minimum distance (the discrepancy distance between item 30 and 34 in fig. 2 is minimal on the grid, as there is no other way of calculating a closer distance on the grid) between the optical center (“the optical center of the grid pattern 32 which was the location of the first image 30” at 3:51-62; fig. 2, item 30) and said incident beam of light (fig. 2, item 36) is the minimum distance (the discrepancy distance between item 30 and 34 in fig. 2 is minimal on the grid, as there is no other way of calculating a closer distance on the grid) between the optical center (fig. 2, item 30 obtained from fig. 1) and said incident beam of light (fig. 2, item 36); and

wherein the incident beam of light directly projected from the object to the lens of the camera unit (“point light source 12 may be noncoherent light emitted by a small size ordinary penlight bulb” at 2:62-64),

Genco et al. does not disclose compensating a position of the object contained in the captured image according to the calculated discrepancy (i.e., moving item 36 to overlap item 30).

Beuker et al. teaches compensating a position of an object (e.g., fig. 4, item 16) contained in a captured image (leg item 16 in captured image item 41_{n-1} is aligned with captured image item 41_n at fig. 4) according to a calculated discrepancy (the discrepancy calculated from e.g., item 43’ and item 43’’ at fig. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the position of the object contained in the captured image according to the calculated discrepancy of *Genco et al.* to be compensated by overlapping as taught by *Beuker et al.* “to provide apparatus and methods which simply and stably determine accurate projective transformation relating two images from pairs of corresponding points identified in each image of the pair.” *Beuker et al.* at para.0009.

Regarding **claim 3**, claim 2 recites identical features as in claim 3. Thus, references/arguments equivalent to those presented above for claim 2 are equally applicable to claim 3.

Regarding **claim 5**, *Genco et al.* discloses wherein the pixel position detection means (fig. 2, items 24, 30-36) detects the position of the pixel representative of the object (fig. 2, item 12) having a marker (item 12 has a marker - itself) identifying a typical spot of the object (fig. 2, item 36 is a spot identifying item 12).

Regarding **claim 7**, claim 2 recites identical features as in the computer program for a computer (“microcomputer” at 4:1-2) used for an apparatus of claim 7. Thus, references/arguments equivalent to those presented above for claim 2 are equally applicable to claim 7.

Regarding **claim 10**, *Genco et al.* discloses wherein said discrepancy calculating step involves use of calibration information (fig. 1; fig. 2, item 30) for the camera unit prepared in advance, wherein said method further involves generating said calibration information in the steps of:

projecting a beam of light (“point source of light” item 12 at fig. 1) on individual pixels of a camera image (fig. 1, item 18);

according to the beam of light incident to each pixel, calculating a displacement (distance between item 30 and 34 at fig. 2) from a reference point (fig. 2, item 30) to the incident beam of light (the incident beam of light must be from item 12 of fig. 2); and

generating the calibration information (fig. 1, item 30) by correlating a direction and the displacement of the incident beam of light (the incident beam of light must be from item 12 of fig. 2) with a position of each pixel (fig. 1 memorizes the position and any displacement of item 30).

Regarding **claim 15**, *Genco et al.* discloses further comprising the step of outputting the compensated position of the object as an actual position of the object (the compensated position of the object item 36 is the current actual position, taken after the first fig. 1 optical center position test).

Regarding **claim 16**, *Genco et al.* discloses further comprising the step of outputting the calculated position of the object as an actual position of the object (the calculated position of the object item 36 is the current actual position, taken after the first fig. 1 optical center position test).

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Genco et al. in view of Beuker et al. and Day et al.

[6] **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination between *Genco et al. in view of Beuker et al.* and U.S. Patent No. 4,639,878 (issued Jan. 27, 1987, “Day et al.”).

Regarding **claim 4**, while *Genco et al. in view of Beuker et al.* discloses the apparatus according to claim 3, *Genco et al. in view of Beuker et al.* does not teach wherein the camera unit comprises cameras in sets of at least two so as to take a plurality of images and the storage means stores the calibration information for each camera.

Day et al. discloses a system for automatically determining the position and attitude of an object (fig. 3) wherein the camera unit comprises cameras in sets of at least two (fig. 3, item 26) so as to take a plurality of images (6:65-66) and the storage means (fig. 3, item 42) stores the calibration information for each camera (8:20-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of *Genco et al. in view of Beuker et al.* to include the camera unit comprising cameras in sets of at least two so as to take a plurality of images as taught by *Day et al.* “...for automatically determining the position and attitude of a three-dimensional body...”, *Day et al.*, 3:66-68 and the storage means storing the calibration information for each camera as taught by *Day et al.* for the computer 40 to access the information from the mass storage 42 for calculation purposes.

Allowable Subject Matter

[7] **Claims 12-14** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

[8] The following is a statement of reasons for the indication of allowable subject matter:

Regarding **claim 12** (and claims 13-14 by analogy), while the prior art of record teaches the camera unit being adapted to be positioned on one of an automobile and a movable robot, the prior art of record does not teach wherein the method further includes outputting the calculated position of the object to the automobile or the movable robot.

Conclusion

[9] Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

[10] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578 and fax number (571)270-2578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

/Bhavesh M Mehta/

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